Middle Middle Miocene Fan 1 (MM7 F1) Play

Cibicides opima through _Bigenerina humblei_ biozones
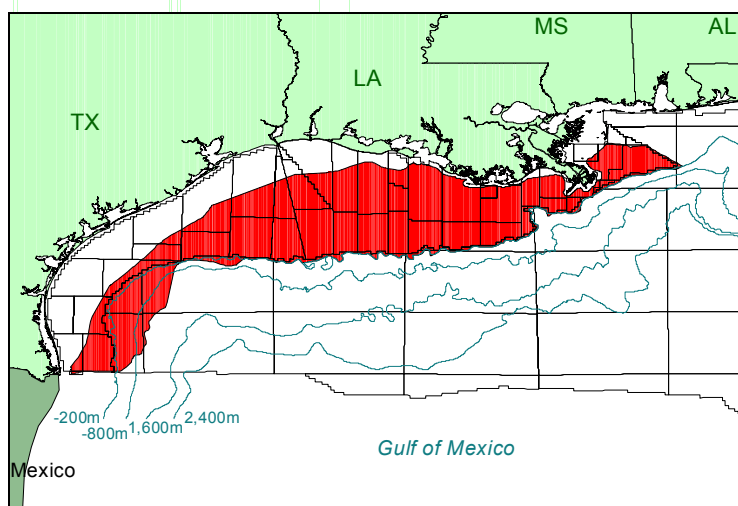

Figure 1. Play location.
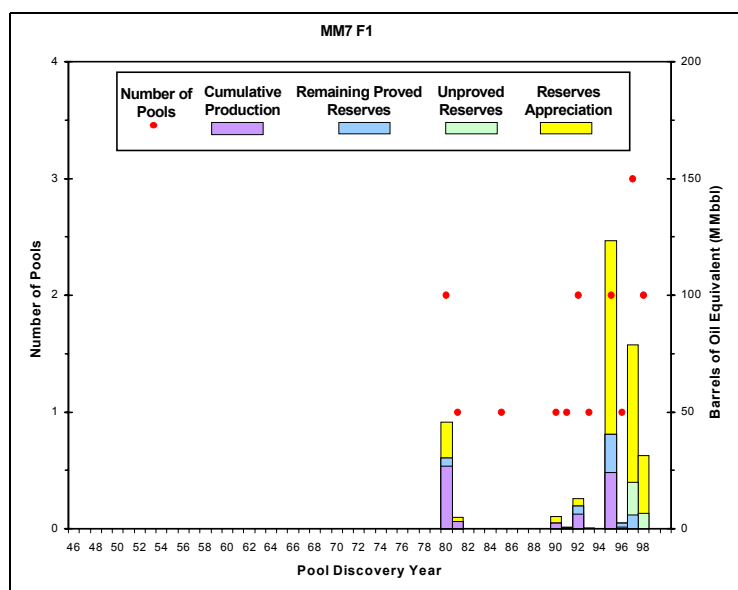

Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

MM7 F1 Play			
17 Pools 33 Sands	**Minimum**	**Mean**	**Maximum**
Water depth (feet)	13	146	399
Subsea depth (feet)	9480	12908	16165
Number of sands per pool	1	2	8
Porosity	20%	25%	31%
Water saturation	16%	31%	58%

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

Play Description

The established Middle Middle Miocene Fan 1 (MM7 F1) play occurs within the _Cibicides opima, Cristellaria_ "I," and _Bigenerina humblei_ biozones. The play is also defined by deep-sea fan sediments in an extensional structural regime of salt-withdrawal basins and extensive listric faulting located on the modern Gulf of Mexico Region shelf. The MM7 F1 play extends from the South Padre Island Area offshore Texas to the Main Pass Area east of the present-day Mississippi River Delta (figure 1).

Updip, the play extends onshore except for in the South Padre Island to Eugene Island Areas, where the play is bordered by the shelf margin and the Middle Middle Miocene Progradational (MM7 P1) play. To the southwest, the MM7 F1 play extends into Mexican national waters. To the northeast, the play onlaps the Cretaceous carbonate slope. Downdip, the play is limited by the Middle Middle Miocene Fan 2 (MM7 F2) play.

Play Characteristics

The MM7 F1 play is characterized by deepwater turbidites deposited in channel/levee complexes, sheet-sand lobes, interlobes and lobe fringes, and slumps. These sediments were deposited on the upper and lower slope, in topographically low areas between salt structure highs and on the abyssal plain. MM7 deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

Structural styles associated with MM7 F1 fields include normal faults and, less commonly, salt diapirs with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Stratigraphic traps
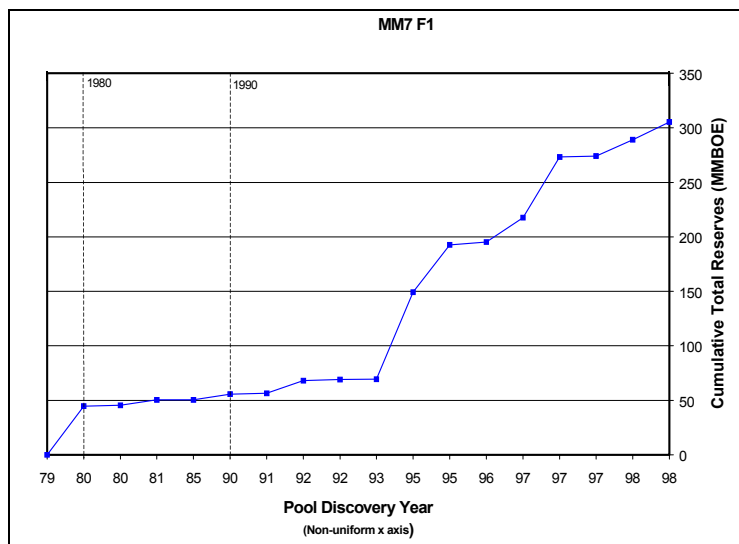
Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

MM7 F1 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	14	0.016	0.444	0.095
Cumulative production	--	0.010	0.303	0.064
Remaining proved	--	0.006	0.141	0.031
Unproved	3	0.010	0.059	0.021
Appreciation (P & U)	--	0.049	0.790	0.189
Undiscovered Conventionally Recoverable Resources				
95th percentile	--	0.175	1.928	0.525
Mean	68	0.212	2.304	0.622
5th percentile	--	0.263	2.837	0.754
Total Endowment				
95th percentile	--	0.250	3.221	0.830
Mean	85	0.287	3.597	0.927
5th percentile	--	0.338	4.130	1.059

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

are created by permeability barriers, updip sand pinchouts, or updip facies changes. Seals are provided by the juxtaposition of reservoir sands with shales and salt, either structurally (e.g., faulting, diapirism) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The MM7 F1 play is predominantly a gas play, with total reserves of 0.075 Bbo and 0.1.293 Tcfg (0.305 BBOE), of which 0.010 Bbo and 0.303 Tcfg (0.064 BBOE) have been produced. The play contains 33 producible sands in 17 pools of which 14 contain proved reserves (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves in the play were added in 1980 when the Eugene Island 24 and Main Pass 73 fields were discovered. Maximum yearly total reserves of 123 MMBOE were added in 1995 by the discovery of two pools, including the largest pool in the play (80 MMBOE) in the Main Pass 223 field (figure 2). Forty-seven percent of the play's cumulative production and 17 percent of the play's total reserves have come from pools discovered before 1990. The most recent discovery, prior to this study's cutoff date of January 1, 1999, was in 1998.

The 17 discovered pools contain 42 reservoirs, of which 38 are nonassociated gas and 4 are undersaturated oil. Cumulative production has consisted of 84 percent gas and 16 percent oil.

Assessment Results

Because of limited data available for the MM7 F1 play, the Middle Lower Miocene Fan 1 (LM2 F1) play was used as an analog to forecast pool sizes in the MM7 F1 play. The LM2 F play was selected because of similarities in depositional setting, structural style, hydrocarbon type, and statistical information.

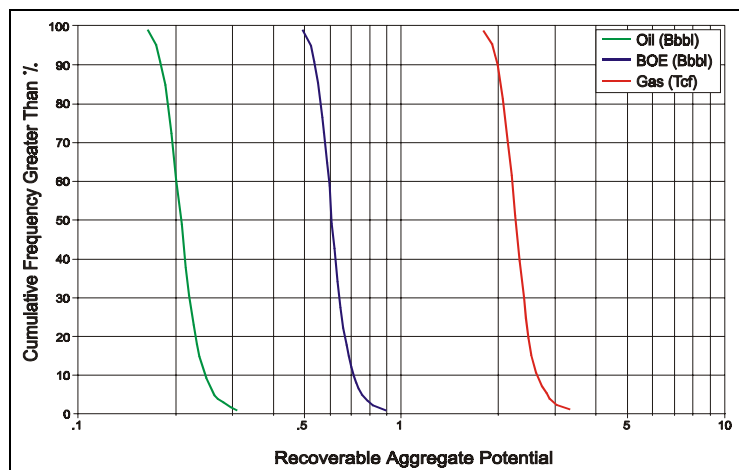The marginal probability of hydrocarbons for the MM7 F1 play is

Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.
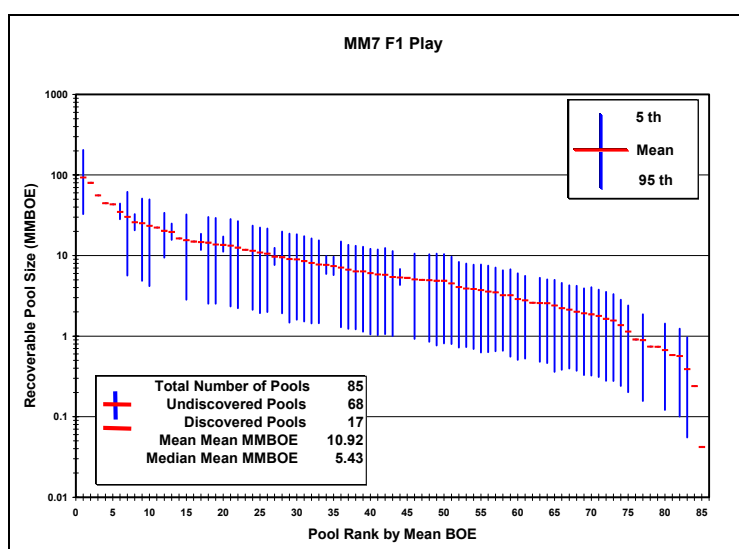

Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

1.00. The play contains a mean total endowment of 0.287 Bbo and 3.597 Tcfg (0.927 BBOE) (table 2). Seven percent of this BOE mean total endowment has been produced.

Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of 0.175 to 0.263 Bbo and 1.928 to 2.837 Tcfg at the 95th and 5th percentiles, respectively (figure 4). Mean UCRR are estimated at 0.212 Bbo and 2.304 Tcfg (0.622 BBOE). These undiscovered resources might occur in as many as 68 pools. The largest undiscovered pool, with a mean size of 93 MMBOE, is also the largest pool in the play (figure 5). The forecast places the next four pools in position 6, 7, 8, and 9. For all the undiscovered pools in the MM7 F1 play, the mean mean size is 9 MMBOE, which is significantly smaller the 18 MMBOE mean size of the discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 11 MMBOE.

Because of the depth of the prospective section (9,000 to 16,000 feet; table 1), much of the MM7 F1 play area has yet to be tested. BOE mean UCRR contribute 67 percent of the play's BOE mean total endowment.